4.1 Energy Efficiency Portfolio Standards

Policy Description and Objective

Summary

Effectively designed Energy Efficiency Portfolio Standards (EEPS) can help ensure that cost-effective energy efficiency opportunities are pursued to help manage electricity demand growth, lower overall and peak electricity prices, cut emissions, and address reliability concerns.

A growing number of states are adopting EEPS,[8] or similar provisions, to ensure that cost-effective energy efficiency measures are used to help offset growing electricity demand. Similar to renewable portfolio standards (RPS) already in place in 21 states and Washington, D.C. (see Section 5.1, *Renewable Portfolio Standards*), EEPS require that energy providers meet a specific portion of their electricity demand through energy efficiency. EEPS are intended to help overcome the various barriers that keep utilities and other players from investing in cost-effective energy efficiency that several studies predict could meet up to 20% of the nation's energy demand, or about half of the expected demand growth (Nadel et al. 2004). States have found that establishing explicit targets, based on sound analysis of technical and economic potential, can help reduce energy demand as well as lower electricity prices, cut emissions, help address concerns with system reliability, and provide other energy-related benefits (see Chapter 1, *Introduction and Background*, for more on the benefits of energy efficiency).

EEPS designs vary by state and include targets that range from the equivalent of a 10% to a 50% reduction in energy demand growth. EEPS were first set in Texas as energy efficiency goals under their 1999 restructuring rules. Texas required utilities to use energy efficiency to meet 10% of their demand growth in by 2004. California adopted annual energy savings goals for 2004 to 2013 for their four largest utilities covering both electricity and natural gas providers (the only state to include both). California's targets, set in terms of kilowatt-hours (kWh) and therms saved based on percentages of total sales, are expected to reduce demand growth by more than 50% for electricity and more than 40% for natural gas. Connecticut recently required its energy providers to meet a portion of their supply (i.e., 1% in 2007 growing to 4% by 2010) from distributed resources, including energy efficiency from commercial and industrial facilities, load management, and combined heat and power (CHP). Illinois recently adopted voluntary EEPS that call for energy efficiency to meet 25% of electricity demand growth by 2015. New Jersey is examining EEPS based on kWh saved as a component of its public benefits fund (PBF) program (see Section 4.2, *Public Benefits Funds for Energy Efficiency)*. Pennsylvania includes energy efficiency as one option for meeting its Alternative Energy Portfolio Standard. In at least two states, Hawaii and Nevada, utilities can use energy efficiency to meet some or all of their requirements under an RPS (see Section 5.1, *Renewable Portfolio Standards*).

While the benefits of energy efficiency measures are well documented, Texas is the one state in which standards have been in place long enough to measure results from an EEPS approach. The 10% reduction in load growth goal was exceeded in 2004 and, in that year, Texas saved more than 400 million kWh at a cost of $82 million, for a net benefit of $76 million to date (Gross 2005b). The cumulative effect of California's 10-year EEPS is estimated, by 2013, to result in annual savings of over 23,000 gigawatt-hours (GWh) electricity and 400 million therms natural gas. Peak electricity demand savings are expected to top 4,800 megawatts (MW) (CPUC 2004).

[8] In this *Guide to Action,* the term "Energy Efficiency Portfolio Standards" covers a variety of terms including portfolio standards and resource acquisition requirements and goals.

The Illinois EEPS is estimated to save more than 5,600 GWh by 2017. The energy savings will reduce energy costs for consumers, including significant reductions in prices for natural gas.

Objective

EEPS are intended to overcome barriers to investing in cost-effective energy efficiency. A number of recent studies have indicated that technically feasible, economically viable, but as yet untapped, energy efficiency measures could meet up to 20% of the nation's energy demand, or about half of the expected demand growth (Nadel et al. 2004). However, in many states, market barriers, regulatory disincentives, or insufficient information about the benefits of energy efficiency keep utilities and other players from investing in cost-effective energy efficiency to its full potential. States have found that establishing an explicit, mandatory target, based on sound analysis of technical and economic potential, can help overcome these barriers. In some cases, states have combined EEPS with additional policy measures such as PBFs and rate adjustments that decouple utility sales and profits to help further address these barriers. (See Section 6.2, *Utility Incentives for Demand-Side Resources*.)

Benefits

By increasing investments in cost-effective energy efficiency, EEPS can achieve modest to significant reductions in both electricity and natural gas (depending upon the level of the target). Associated with the reduction in power demand are additional benefits including: lower energy bills, reduced air pollutant and greenhouse gas emissions, reduced strain on power grids, and lower wholesale energy prices (see Chapter 1, *Introduction and Background*, for more on the benefits of energy efficiency). Beyond the benefits tied to reduced energy use, states have found EEPS have a number of particular advantages as a policy approach including: simplicity, cost-effectiveness, specificity, economies of scale, and economies of scope.

- *Electricity Savings*. The amount of electricity savings from EEPS depend on the level and timing of the EEPS targets, how the target is expressed, the actual level of demand growth, and other market forces. In the electricity sector, EEPS goals currently range from 10% of forecast electricity sales *growth* (e.g., in Texas) to almost 1% of total electricity *sales* annually (e.g., in California where this amounts to more than 50% of projected growth). See Table 4.1.1 on page 4-6 for a summary of current targets.
- *Natural Gas Savings.* EEPS for natural gas providers, such as the one adopted by California, will help reduce direct natural gas use. In addition, EEPS for electricity can help reduce natural gas used in electricity generation. In general, one unit of electricity saved through energy efficiency saves about three units of natural gas used for electricity generation due to generation and transmission losses. This makes saving natural gas through electric energy efficiency very cost-effective. A recent study shows that the majority of cost-effective natural gas savings would come through electricity end-use efficiency investments (Elliot et al. 2003).
- *Simplicity.* EEPS create a straightforward resource acquisition target for energy providers.
- *Cost-Effectiveness.* Setting an energy efficiency requirement without explicitly setting aside a pool of funds challenges electricity providers to meet the goal in the most cost-efficient manner. This can be reinforced through appropriate funding and cost recovery mechanisms, as noted on page 4-8.
- *Specificity.* By articulating a specific, numeric target, EEPS can be effective in illuminating how much energy efficiency will contribute to reaching goals of energy demand reduction as well as emission reductions and other public policy goals.
- *Economies of Scale.* The macro-level targets inherent in EEPS allow energy providers to aggregate savings across enough end-uses and sectors to meet the overall savings goals cost-effectively. This helps address a fundamental barrier to energy efficiency resource development: the distributed nature of energy efficiency resources. Securing substantial energy efficiency gains in every end-use and use sector involves millions of homes, offices, factories, and other facilities and thus can

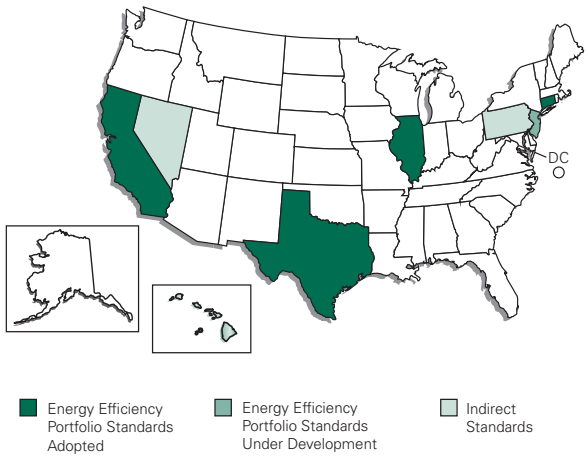
be difficult when approached at a micro-level. States sometimes designate an aggregator, such as a distribution utility, with the responsibility for reaping these savings as a means of overcoming this obstacle. On the administration side, EEPS allow a state to bundle energy efficiency opportunities, and set overall goals for procuring energy efficiency within the state, coordinating the process and simplifying compliance evaluation.

States with Energy Efficiency Portfolio Standards

As noted in the previous section, EEPS designs vary by state and include targets that range from the equivalent of a 10% to a 50% reduction in energy demand growth. Seven states have adopted EEPS, either directly or indirectly (see Figure 4.1.1). Texas and California have EEPS in place; Connecticut recently enacted a distributed RPS that includes energy efficiency, load management, and CHP; Illinois recently adopted a voluntary EEPS; New Jersey is examining EEPS as a component of its PBF program; Pennsylvania includes energy efficiency as one option for meeting its Alternative Energy Portfolio Standard (AEPS); and in Hawaii and Nevada, utilities can use energy efficiency to meet some or all of their requirements under an RPS. In addition, several states with PBFs have conducted energy efficiency analyses, potential studies, and goal-setting exercises, but energy efficiency goals have not been prominently featured. See Table 4.1.1 on page 4-6 for more details.

EEPS policies have been developed primarily in states with restructured utility markets, generally as a partial replacement for the Integrated Resource Planning (IRP) requirements that were removed as part of restructuring. California, which suspended its restructuring policy after its 2001 electricity experience, is an exception, as are Hawaii and Nevada. In restructured markets, the EEPS approach is being integrated into broader energy resource planning activities such as portfolio management, described in Section 6.1, *Portfolio Management Strategies*. Under the IRP framework in place in most traditionally regulated states, efficiency investment levels are typically based on the total level of savings that can be acquired within the bounds of economic criteria. States use similar kinds of economic analysis to develop estimates of efficiency potential in the process of setting EEPS goals. The difference is that the EEPS process tends to set goals in an aggregate, top-down fashion, whereas regulated utility programs are typically developed on an individual, bottom-up basis.

Figure 4.1.1: States That Have Adopted or Are Developing EEPS



Source: EPA 2005.

Designing an Effective EEPS

A number of key design issues have emerged from EEPS efforts to date or are central to the design of any efficiency program, including: who participates in different aspects of the process; how to set a target, including its coverage, timing, and duration as well as what analysis to consult; potential funding sources; and how the policy interacts with federal and other state policies. Although there are only a few EEPS in place, they share a number of characteristics that other states have considered when designing a program. States have also drawn upon their own past experience with designing and administering energy efficiency programs.

Participants

- *State Legislatures.* In many states, legislation is required to enable the setting of EEPS targets.

Table 4.1.1: Current and Pending State EEPS Policies

State	EEPS Description	Applies to	Savings Target	Time Frame
California	Sets specific energy and demand savings goals	Investor-owned utilities (IOUs)	Savings goals set for each program year from 2004 to 2013 The savings target for program year 2013 is: • 23,183 GWh 4,885 MW peak • 444 million therms	2004-2013 Annual megawatt-hours (MWh), MW, and therm savings adopted for each of these years
Connecticut	Includes energy efficiency at commercial and financial facilities as one eligible source under its Distributed RPS (also includes combined heat and power and load management programs)	IOUs	Savings goals set for the beginning of each program year:	
			1%	2007
			2%	2008
			3%	2009
			4%	2010 and thereafter
Hawaii	Allows efficiency to qualify as a resource under RPS requirements	IOUs	20% of kWh sales (overall RPS target, energy efficiency portion not specified)	2020
Illinois	Will set goals as percentage of forecast load growth	IOUs	10%	2006–2008
			15%	2009–2011
			20%	2012–2014
			25%	2015–2017
New Jersey	Will set energy and demand goals for overall PBF program	PBF program administrators (based on competitive solicitation; originally it was IOUs)	1814 GWh (four-year total)	2005–2008
Nevada	Redefines portfolio standard to include energy efficiency as well as renewable energy	IOUs	Energy efficiency can meet up to 25% of the energy provider's portfolio standard:	
			6%	2005–2006
			9%	2007–2008
			12%	2009–2010
			15%	2011–2012
			18%	2013–2014
			20%	2015 and thereafter
Pennsylvania	Includes energy efficiency as part of a two-tier AEPS	IOUs	4.2%	Years 1–4
			6.2%	Years 5–9
			8.2%	Years 10–14
			10.0%	Years 15 and thereafter
Texas	Sets goals as percentage of forecast load growth	IOUs	10%	2004 and thereafter

Note: See *Examples of Legislation/Regulation* for each state on page 4-16.

Legislatures have either set EEPS targets in legislative language or directed an executive agency to do so. In either case, states have clearly designated an executive agency to work out details and administer implementation of the targets.

- *Public Utility Commissions (PUCs).* PUCs in many other states have the authority to set EEPS directly. PUCs are a likely agency to administer EEPS, given their oversight role of utility markets.
- *Utilities.* Given the direct impact on the utility sector, legislatures and PUCs have sought input on the impacts on utility profitability and ongoing operations when designing an EEPS, as well as developing accompanying ratemaking and other regulatory policies. Utilities may directly implement the ensuing energy efficiency programs or states may require them to utilize energy service companies. Efforts typically include standard offer or market transformation programs (see description of Texas program on page 4-13 for more detail).
- *Customers/General Public.* States have created public comment processes to help inform topics such as potential costs/economic impacts and benefits, including health benefits and other effects of reduced emissions.
- *Public Interest Organizations.* Groups representing consumers, environmental interests, and other public interests have been involved to offer technical expertise as well as public perspectives.

Setting a Target

Under EEPS, a state utility commission or other regulatory body specifies numerical energy savings targets that electricity service providers must meet, on an annual and sometimes cumulative basis. EEPS can be set as a percentage of load growth or base year sales, or as a fixed number of units of energy savings (e.g., kWh), the latter having the advantage of the actual energy savings being known in advance. Targets can also cover peak electricity demand (e.g., MW capacity). The appropriate EEPS target depends upon a number of factors including the economically achievable energy efficiency potential, funding availability, emission reduction goals, and other issues including how to treat any existing energy efficiency requirements (e.g., if a robust PBF program or utility program is in place). Key issues to consider include determining how and what analysis to conduct, establishing coverage, deciding the timing and duration of the targets, and addressing funding and related cost recovery issues.

Analysis of Efficiency Potential and Benefits

States have set EEPS based on solid analysis and program experience within the state or in states believed to be comparable. The analysis typically has included a robust study of energy efficiency potential (technically, economically, and practically achievable)[9], combined with a review of past program experience with energy efficiency measures. California's electricity EEPS are designed to capture 70% of the economic potential for electric energy savings over their 10-year period. California's natural gas EEPS are designed to capture approximately 40% of the maximum achievable potential, in recognition that the need to ramp up efforts may take longer than on the electric side.

In addition to estimating efficiency resource potential, states have estimated other benefits such as expected emission reductions, reduced power prices and total power costs, and net economic benefits such as increased gross state product and increased jobs and wages, using power-sector models and economic impact models (see Chapter 2, *Developing a Clean Energy-Environment Action Plan*, and Section 3.3, *Determining the Air Quality Benefits of Clean Energy*). California's goals were established by considering both per capita energy reduction goals and cost-effectiveness at various reduction levels.

[9] These are tiers that represent what is first, technically achievable, and of that subset, what is second, economically achievable, and of that subset, finally, what is practically achievable. For more information, see Appendix B, *Energy Efficiency Program Resources*.

Coverage

The coverage of an EEPS depends on the entities under the state's jurisdiction. In the majority of states, state utility commissions typically do not have authority to set requirements for municipal, federally owned, or rural cooperative utilities (although many states do have authority). For this reason, EEPS requirements tend to be assigned to investor-owned utilities. Most EEPS have covered electric utilities alone, although California has set savings goals for both electric and gas utilities.

States have sometimes included provisions to ensure that the energy efficiency measures used (and hence the energy bill savings) are distributed among customer classes (e.g., residential, industrial, commercial) and income levels.

Timing and Duration

Determining the timing and duration of EEPS includes considering the time it can take to achieve energy savings. Generally only a portion of the total energy savings potential can be realized in a given year because of the length of market cycles, limits on funding, and other real-world considerations. Reviewing regulatory compliance deadlines and the achievable efficiency potentials for specific years can help inform these considerations.

Funding

Establishing regulatory mechanisms and/or funding sources for utility or public programs to help achieve the efficiency resource goals is another key issue states have encountered. Different approaches have included one or more of the following: utilizing resources under a state PBF, allowing for cost recovery as part of utility rates, providing direct funding, and establishing regulatory provisions that decouple utility profits from sales volumes (see Section 4.2, *Public Benefits Funds for Energy Efficiency*, and Section 6.2, *Utility Incentives for Demand-Side Resources)*.

Program design may or may not involve defining how funds will be raised, spent, and accounted for in meeting EEPS goals. In California, for example, the PUC requires the utilities to invest in cost-effective energy efficiency as a procurement resource using procurement funds that would otherwise go to purchase power; the utilities also use PBFs and efficiency resource acquisition funds to meet the overall goals.

Best Practices: Designing an EEPS

While states have had limited experiences with EEPS as a top-level policy mechanism to date, they have accumulated numerous experiences related to the technologies, programs, and implementation issues related to EEPS goals. In this context, best practices include:

- Obtain top-level commitment to EEPS as a state policy goal, through the legislature, utility commission, or other cognizant bodies.
- Involve key stakeholders early in the development process and provide for continuing stakeholder involvement.
- Use sound analysis, including emissions modeling, economic analysis, and efficiency potential studies, to provide a strong quantitative basis for the EEPS goal.
- Set energy savings goals linked to available, cost-effective potential, based on both quantitative analysis and stakeholder input.
- Use a clear basis for stating goals. Most states specify EEPS goals as a percentage of base-year energy sales or of forecast energy sales growth. Convert EEPS goals to annual energy savings goals and establish methods for converting energy savings to emission reductions.
- Establish an appropriately long time frame to overcome longer market cycles, funding limits and practical considerations, and set annual and cumulative savings goals (e.g., California uses a 10-year time frame with a three-year update cycle).
- Ensure that workable funding methods are available to meet the EEPS goal. The state PUC (or other oversight body) typically performs this task.
- Specify the entities that are responsible for meeting the target and the procurement rules they must follow.

Interaction with Federal Policies

A variety of federal programs, partnerships, and technical assistance are available to help states achieve their energy efficiency goals. The ENERGY STAR program, for example, offers technical specifications, certification processes, and market development assistance to states and other partners for a range of products and whole-building solutions. (See Section 4.2, *Public Benefits Funds for Energy Efficiency*, for a broader discussion of ENERGY STAR activities.)

As with other energy efficiency measures, to the extent that EEPS produce verifiable capacity savings, they can have favorable reliability and resource adequacy implications reflected in federally jurisdictional wholesale markets overseen by Federal Energy Regulatory Commission (FERC), North American Electric Reliability Council (NERC) and the regional reliability organizations, regional transmission organizations (RTOs), and transmission owning companies.

Interaction with State Policies

EEPS can complement other energy efficiency policies and serve as a framework for a suite of policies and programs. EEPS can be goals for PBF-supported programs or can be additional resource goals beyond savings realized through PBF programs. In addition, some states with EEPS have allowed utilities to recover costs through ratemaking procedures (see Texas example on page 4-13). In some cases, states have pursued decoupling policies to address adverse revenue and profit impacts on investor-owned utilities from EEPS implementation (see Section 6.2, *Utility Incentives for Demand-Side Resources*).

Program Implementation and Evaluation

The implementation of an EEPS occurs primarily through designated utilities and other energy services providers. However, continued state involvement is important in overseeing the development of implementation rules and may be important in ensuring the necessary funding is available. In Texas, for example, where the electric distribution utilities must meet the EEPS goals, the utility commission is actively involved in determining how resources can be acquired, including defining the means by which covered entities are allowed to comply with goals; defining and implementing reporting requirements; and defining measurement, verification, and other evaluation methods by which compliance will be determined.

Measurement and verification (M&V) is a key aspect in evaluating EEPS. In particular, where EEPS are tied to tradable (energy efficiency) credits, robust measurement and verification is critical to maintaining credibility for the market and commodity. (See the *Approaches to Measurement and Verification [M&V]* box on page 4-10 for more detailed information on the approaches states are using for M&V.)

Oversight

It is also likely that some form of oversight will be needed in the implementation of EEPS. States have decided to establish official oversight or advisory bodies, typically composed of stakeholders who periodically review the EEPS program to determine whether its goals are being met, whether its goals should be renewed or adjusted, and whether other aspects of implementation need modification.

Best Practices: Implementing an EEPS

- Use a clear basis for assessing compliance.
- Update goals on a regular basis (e.g., California uses a three-year cycle) to adjust for changes in economic growth, actual savings, and results of measurement and evaluation studies.
- Ensure additionality (e.g., net new energy savings) by stipulating that savings allowed to qualify for EEPS goals must be over and above any existing program commitments.
- Coordinate EEPS with market transformation programs, PBFs, and other programs to facilitate the market changes that are needed to reach EEPS goals.
- Ensure that electricity and natural gas demand forecasts used in supply-side resource filings reflect the energy savings goals.

Approaches to Measurement and Verification (M&V)

The two principal approaches for measuring and verifying energy efficiency measures are the "deemed savings" approach and the project-specific approach. The deemed savings approach involves estimating energy savings by combining verification that the energy efficiency measure has been installed and can be attributed to the program with the pre-calculated or "deemed" savings from using that measure. This approach can provide an accurate estimate of avoided consumption while minimizing the complexity and cost of M&V by drawing on the extensive field experience from other states. However, it is most appropriate for use with simpler measures whose performance characteristics are consistent in varying applications: a residential lighting retrofit is a typical example.

Deemed savings are calculated by subtracting the energy use of the energy-efficient fixture from the energy use of the baseline fixture. Baseline energy usage and reduced energy usage can be easily calculated based on the deemed savings per fixture, hours of use, and number of installed fixtures. It is also possible to build factors into deemed savings methods to account for persistence of savings, failure rates, free riders, spillover effects, and other issues that can modify total energy impacts. Field evaluation data on many types of efficiency measures are available and can be used to estimate discount factors for a given sample of efficiency measures.

A project-specific M&V method is most widely used for larger and more complex energy efficiency investments. The most well known and referenced M&V document is the International Performance Measurement and Verification Protocol (IPMVP). The IPMVP provides an overview of current best practice techniques available for verifying results of energy efficiency, water efficiency, and renewable energy projects in commercial and industrial facilities. The IPMVP was developed with sponsorship of the U.S. Department of Energy (DOE) and is currently managed by a nonprofit organization that is continually developing new sections for publication as publicly available documents (IPMVP 2005).

Some states use their own project-based M&V system. For example, Texas provides detailed guidance on how to prepare and execute an M&V plan (Texas PUC 2005). California also maintains project-specific M&V resources on its California Measurement Advisory Council (CALMAC) Web site (CALMAC 2005).

Best Practices: Evaluating EEPS Policies

- Design programs under the EEPS policy with evaluation in mind, by building in key tracking and reporting practices that establish baselines for affected markets and technologies and provide the data needed to assess program impacts.
- Draw on other states' experiences to establish rigorous and workable measurement, verification and reporting protocols (e.g., proof of installation, deemed savings, IPMVP). California uses statewide evaluation guidelines for this purpose (see California Public Utilities Commission [CPUC] Web site).
- In addition to quantitative impact evaluation, provide for a qualitative evaluation process that enables program administrators to obtain useful feedback and improve program effectiveness over time.
- Evaluate programs operated under an EEPS policy at appropriate intervals, so that agency overseers can gauge compliance with energy savings goals.
- Utilize an independent, third-party verifier to help build confidence in results. (See text box, *Approaches to Measurement and Verification [M&V].*)
- Provide for adequate program funding.
- Based on evaluation results, provide feedback to oversight agencies, program administrators, and other participants. Adjust future energy savings goals, as needed.

State Examples

California

California's EEPS emerged from the state's "post-restructuring" resource planning process. Following the state's 2001 electricity problems, the Legislature and the CPUC reviewed the state's overall utility resource planning process and decided to re-engage investor-owned utilities in managing a portfolio of resources to meet customers' needs, including procurement of energy efficiency resources. The CPUC also adopted "decoupling" ratemaking mechanisms that break the link between the utilities' revenues and sales, removing disincentives for utility investments in energy efficiency. (See Section 6.2, *Utility Incentives for Demand-Side Resources.*)

The California EEPS sets ambitious energy savings goals for both electric and gas utilities. Taking direction from the California Energy Action Plan (EAP) and extensive analysis of the economic and achievable potential for energy efficiency, as well as considerations of extensive stakeholder input, the CPUC adopted annual energy savings goals for the state's four largest IOUs. Utility procurement funds are allocated, in addition to California's existing PBF, to achieve these goals and goals for cost-effective efficiency resources. Each IOU acts both as a portfolio manager and program administrator. In doing so, the IOUs assemble their respective portfolios and seek approval for them from the CPUC. The energy efficiency portfolio of programs must meet California's cost-effectiveness tests, and funding source (procurement vs. public benefits) is not a determining factor in approval by the CPUC. The rules that govern all aspects of portfolio management and program administration are found in the CPUC policy manual. The energy savings goals were adopted by the CPUC and established through a collaborative effort with the California Energy Commission (CEC) and with input from key stakeholders (e.g., utilities, environmental groups, and businesses) (CPUC 2004).

Energy efficiency goals are targeted for each year from 2004 to 2013. The cumulative effect of the programs funded from 2004 to 2013 is estimated to result in annual savings in program year 2013 of 23,183 GWh; 4,885 MW of peak demand; and 444 million therms natural gas. These 10-year goals are projected to meet 54% to 59% of the IOUs' electricity sales growth by 2013 and 44% of natural gas sales growth. Program administrators from each IOU are required to submit energy efficiency program plans and funding levels to the PUC.

Also included in the EAP adopted by the CPUC and the CEC, a "loading order" for energy resources was established in which cost-effective energy efficiency and conservation resources are to be selected first, followed by renewable generation. Fossil-fired generation is acquired to meet any remaining resource needs. The EEPS policy and PBF programs were merged, and are largely administered by utilities and implemented by a wide range of both utilities and non-utilities. Utilities supplement PBFs through utility procurement funding to ensure that the EEPS goals are met. The utilities are required to reduce their demand forecasts to reflect the adopted energy efficiency savings goals and so are further motivated to ensure the reductions are achieved. The utilities' achievements will be subject to rigorous evaluation, measurement, and verification overseen by the CPUC.

Web sites:
http://www.cpuc.ca.gov/static/industry/electric/energy+efficiency/rulemaking/eegoals.htm

http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/40212.htm

http://www.cpuc.ca.gov/PUBLISHED/REPORT/28715.htm

Illinois

The Illinois Sustainable Energy Plan recommends an energy efficiency portfolio standard that will meet 25% of projected annual load growth by 2015–2017. The Illinois Commerce Commission (equivalent to a state PUC) recently adopted a resolution adopting the proposed plan with some modifications, including moving the start date from 2006 to 2007, to allow for more time to develop market-ready resources and to better align the effort with the timing of related regulatory provisions (the plan itself is voluntary). It has been estimated that the Illinois Sustainable Energy Plan, including the EEPS, will save more than 5,600 GWh, generate more than $2 billion in investments in Illinois, and create about 2,000 construction jobs and hundreds of permanent jobs (ASE 2005, ICC 2005).

The Illinois EEPS is part of a broader effort that includes an RPS requirement and is intended to gain the combined benefits of reduced demand growth and increased clean generation. This twin approach has broad support from utilities, environmental and consumer groups, and other stakeholders.

Web site:
http://www.icc.illinois.gov/en/ecenergy.aspx

Nevada

The Nevada RPS was established as part of the state's 1997 restructuring legislation. In an effort to provide greater flexibility under the RPS, the Nevada legislature adopted Assembly Bill 3 (A.B.3) during a special session in June 2005 to allow electricity providers to meet a portion of their RPS requirements through energy efficiency measures and renewable resources. The bill increases the percentage of energy to come from energy efficiency and renewable sources from 5% (under the original RPS) to 6% from 2005 to 2006 and expands this percentage to 15% from 2011 to 2012 and 20% for 2015 and thereafter. Eligible energy efficiency measures can meet up to 25% of the requirement. Eligible measures include those that are installed on or after January 1, 2005; are located at a retail customer's location; reduce the consumption of energy by the retail customer; and are directly subsidized, in whole or in part, by the electric utility.

In response to this adjustment, two utilities, Nevada Power Company and Sierra Pacific Power Company, have requested approval from the Nevada PUC for additional funding for their 2005 and 2006 demand-side management (DSM) programs. This is the second increase proposed by the utilities since passage of A.B.3. The utilities now plan to spend $16.2 million on 2005 DSM programs and $30.5 million in 2006. The 2006 budget will include more than $2 million for ENERGY STAR appliances and lighting rebates; $1.9 million for recycling of old, inefficient refrigerators; and $185,000 for ENERGY STAR New Construction programs.

Web site:
http://www.newrules.org/electricity/rpsnv.html

New Jersey

New Jersey's PBF program was initially established by restructuring legislation in 1999. Based on a recent reevaluation of the program's design and administration, New Jersey is adding specific resource goals to its PBF program (NJBPU 2004). This is a hybrid approach, in that the overall program is limited by the public benefits charge levels set in the authorizing legislation and is funded like other public benefits programs. In the past, program administrators were not required to meet specific resource goals—their programs were driven primarily by available funding. Under the new Clean Energy Program model, the New Jersey Office of Clean Energy will use energy efficiency to meet overall energy and demand savings goals within the available funding limits.

In another revision to the New Jersey PBF program, administration and delivery of programs will be solicited competitively (originally, electric utilities provided program administration and ran the programs directly), with the winning bidders agreeing to meet the specific energy savings goals. In this sense, the New Jersey program has added an EEPS component (i.e., the energy savings goals) to a PBF program. However, the EEPS requirement is not imposed directly on utilities, but on whatever entity wins the bid to administer PBF funds.

Web site:
http://www.bpu.state.nj.us/home/BOCleanEn.shtml

Click on BPU order EX04040276 (12/23/04).

Pennsylvania

Pennsylvania is pioneering another variation of EEPS. The legislature passed the Alternative Energy Portfolio Standards Act (AEPS) in late 2004. It creates a two-tier set of resource goals for electric utilities. Tier 1 requires 8% of utility energy to come from renewable energy sources (e.g., wind power and solar energy). Tier II calls for a 10% "advanced energy resource" target that can be met by a mix of other types of energy resources, including energy efficiency as well as waste coal generation and hydropower. AEPS represents a new "hybrid" form of EEPS, in that energy efficiency is one of several resources listed in Tier II. In this setting, energy efficiency must compete against the other resource types in Tier II. There is no minimum level of energy efficiency resources that must be acquired (Black & Veatch 2004).

The Pennsylvania AEPS design, in which energy efficiency is included as one of a list of resource options, does not ensure that energy efficiency resources will be acquired. Energy efficiency's contribution to the resource portfolio depends on the availability and relative cost of the resources included in the portfolio. Thus, in theory, if energy efficiency is less expensive than other resource options, it would be acquired in whatever volume is available at the competitive price. However, limited energy efficiency networks, including providers, and other factors may prevent energy efficiency from competing effectively in such a framework. In addition, a lack of mechanisms to decouple utility profits from sales of electricity presents a regulatory disincentive. (See Section 6.2, *Utility Incentives for Demand-Side Resources.*)

While a specific assessment of the energy efficiency aspect of the AEPS has not been conducted, one estimate indicates it could provide cumulative economic benefits of $2.7 billion in electric savings; 70,000 jobs over 20 years (an average of 3,500 new jobs annually); and $2.5 billion in additional earnings (Pletka 2004). Another study identifies 16,000 GWh of potential savings from efficiency measures including energy conservation and energy efficiency measures. The AEPS requires that energy conservation measures save energy; thus, direct load control is not included in the potential total for energy conservation (Black & Veatch 2004).

Web site:
http://www.puc.state.pa.us/electric/electric_alt_energy_port_stnds.aspx

Texas

Texas was the first state to adopt energy efficiency goals for utilities as part of its 1999 restructuring law, Senate Bill 7 (S.B.7). This law called for electric distribution utilities to offset 10% of their forecasted load growth through energy efficiency by January 2004. Following enactment, the PUC worked with stakeholders to determine the specific programs through which this target would be reached. Program templates included the following "standard offer"[10] and "market transformation"[11] measures:

- *Standard Offer.* Commercial and industrial customers, residential and small commercial customers, load management projects, and hard-to-reach customer (customers with an annual household income at or below 200% of the federal poverty guidelines).
- *Market Transformation.* ENERGY STAR homes, residential ENERGY STAR windows, air conditioner distributor, and air conditioner installation information and training.

These programs were funded through a bill charge included in each utility's transmission and distribution rates, collecting about $80 million for annual efficiency program expenditures. Utilities were thus able to recover costs associated with the program, including incentive payments and program administration (capped at 10% of total).

Evaluations indicate that the goal of offsetting 10% of load growth is being exceeded. Load growth has averaged about 2% per year; 10% of this level of growth amounts to about 0.2% of total annual sales (Gross 2005a). Leading state efficiency programs are showing impacts as high as 1% of total annual sales. Projected results include 7,300 tons in nitrogen oxide (NO_x) reductions over 10 years, which Texas estimates is equivalent to removing 140,000 motor vehicles from the roadway, and energy savings valued at $25 million per year.

In addition to the statewide EEPS directed specifically at utilities, Texas broadened its efforts to encompass local governments, in part because Texas contains two severe nonattainment areas for ground-level ozone and sees energy efficiency as an important, cost-effective element of its air quality strategy. In 2001, Texas set energy efficiency goals for local government through Senate Bill 5 (S.B.5)—known as the Texas Emissions Reduction Plan.

[10] Refers to programs where a utility administers a contract with an energy service provider that specifies a standard payment based on the amount of energy saved through the installation of energy efficiency measures.
[11] Refers to strategic efforts, including incentives and education, to reduce market barriers for energy efficiency.

S.B.5 requires 38 local governments to reduce electricity consumption by 5% a year for five years and report annually to the State Energy Conservation Office (SECO). The Texas PUC and SECO are working with local governments and utilities to implement efficiency improvement programs and projects, measure and verify energy savings, and incorporate emission reductions into local air quality plans. The Dallas-Fort Worth nonattainment area is including efforts under S.B.5 in its State Implementation Plan (SIP) for ozone attainment. (See Section 3.3, *Determining the Air Quality Benefits of Clean Energy.*)

Web sites:
1999 Texas Electricity Restructuring Act:

http://www.capitol.state.tx.us/cgi-bin/db2www/tlo/billhist/billhist.d2w/report?LEG=76&SESS=R&CHAMBER=S&BILLTYPE=B&BILLSUFFIX=00007

S.B.7:

http://www.centerpointefficiency.com/about/

http://www.mccombs.utexas.edu/research/bbr/bbrpub/tbr/pdf/Aug.99.zar.pdf

S.B.5:

http://www.seco.cpa.state.tx.us/sb5report2004.pdf

http://www.texasenergypartnership.org/

What States Can Do

States with either restructured or traditional utility markets have set EEPS goals for utilities. These goals can be administered in association with PBFs or regulated utility efficiency programs. Because the EEPS approach can support multiple purposes, including Clean Air Act compliance plans, utility-sector resource plans, and climate action plans, states can set EEPS goals within the context of broad energy and environmental policy goals.

Action Steps for States

The key steps to establishing EEPS are:

- Conduct background analysis, including assessing historical experience and results from past energy efficiency programs and conducting a robust analysis of energy efficiency potential, an economic assessment of potential benefits and costs, and a determination of the range of savings targets that would be realistic for an EEPS.
- Design and develop the EEPS program by determining the appropriate goals, the sectors covered by the goals, the kinds of resources that can be acquired, and the time frame.
- Define an implementation process that sets rules and procedures for how resources can be acquired in the program, M&V requirements, evaluation procedures, and general oversight.
- Provide for periodic evaluation and program review at specified intervals.

Information Resources

Information About States

Title/Description	URL Address
California Action Plan. This Web site contains the text of the California EAP. CEC and CPUC. 2003. California EAP, May 8, 2003. CEC and CPUC.	http://www.energy.ca.gov/energy_action_plan
California Integrated Energy Policy Report. This CEC report lays out policy recommendations for electricity, natural gas, transportation, and the environment. CEC. 2003. California Integrated Energy Policy Report, December. CEC.	http://www.energy.ca.gov/reports/100-03-019F.pdf
CPUC Energy Efficiency Goals Web site. This Web site contains information on energy efficiency potential, including KEMA-Xenergy efficiency potential studies and the Hewlett Foundation "Secret Energy Surplus" report. CPUC. 2005. Evaluation, M&V. CPUC.	http://www.cpuc.ca.gov/static/industry/electric/energy+efficiency/rulemaking/eegoals.htm
Illinois Sustainable Energy Plan. This Web site contains the Illinois Sustainable Energy Plan, as submitted to the Illinois Commerce Commission on February 11, 2005.	http://www.icc.illinois.gov/en/ecenergy.aspx
Midwest Energy Efficiency Alliance (MEAA) Comments to Illinois Commerce Commission on the Illinois Sustainable Energy Plan. MEAA is a collaborative network whose purpose is to advance energy efficiency in the Midwest in order to support sustainable economic development and environmental preservation. It is a leader in raising and sustaining the level of energy efficiency in the Midwest region.	http://www.icc.state.il.us/ec/docs/050309ecCommentsMidwest1.pdf
The Pennsylvania PUC AEPS Web site, 2005. This Web site contains information on legislation, technical conferences, work groups, and general information about alternative energy sources.	http://www.puc.state.pa.us/electric/electric_alt_energy_port_stnds.aspx
Promoting Energy Efficiency in California. State EE/RE Technical Forum, May 18, 2005. Presentation by Brian C. Prusnek, Advisor to Commissioner Susan P. Kennedy, CPUC.	http://www.epa.gov/cleanenergy/pdf/keystone/PrusnekPresentation.pdf

Information About Measurement and Verification

Title/Description	URL Address
Applications Team: Energy-Efficient Design Applications. This Web site provides numerous resources, ranging from implementation guidelines to checklists and other resources, to help organizations implement an M&V program.	http://ateam.lbl.gov/mv/
ASHRAE Guideline 14-2002. Measurement of Energy and Demand Savings. ASHRAE, June 2002. This document provides guidelines for reliably measuring energy and demand savings of commercial equipment.	http://resourcecenter.ashrae.org/store/ashrae/newstore.cgi?categoryid=310&categoryparent=156&loginid=6294016 Click on the link to Guideline 14-2002—Measurement of Energy and Demand Savings.
Section III Measurement and Verification Guidelines. This document provides general guidelines for preparing an M&V plan, choosing an M&V option and method, defining and adjusting baselines, and collecting and submitting M&V data.	http://search.pge.com/cs.html?url=http%3A//www.pge.com/docs/pdfs/biz/rebates/spc_contracts/2000_on_peak_incentive/III-m%26v.pdf&qt=M%26V&col=pge&n=1
CALMAC Web site. California's statewide CALMAC evaluation clearinghouse contains resources for deemed savings and project-specific M&V techniques.	http://www.calmac.org

Title/Description	URL Address
Efficiency Vermont Technical Reference User Manual. Vermont provides a set of deemed-savings methods in this manual.	TRM 4-19, published by Efficiency Vermont 255 S. Champlain Street, Burlington, VT 05401-4717, phone 888-921-5990.
Electric and Gas Conservation Improvement Program Biennial Plan for 2005 and 2006. This plan was submitted to the Minnesota Department of Commerce by Xcel Energy, June 1, 2004. Docket No. E, G002/CIP-04.	URL not available.
EPA report: Creating an Energy Efficiency and Renewable Energy Set-Aside in the NO_x Budget Trading Program: Measuring and Verifying Electricity Savings. This forthcoming EPA report describes key M&V resources.	Contact EPA.
Evaluation, Measurement and Verification Workshop. The CPUC held several workshops on evaluation, measurement, and verification. The primary purpose of these workshops was to discuss the performance basis, metrics, and protocols for evaluating and measuring energy efficiency programs, including incentive, training, education, marketing, and outreach programs.	http://www.fypower.org/feature/workshops/workshop_5.html The final Decision can be found at: http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/45783.htm
IPMVP Web Site. IPMVP Inc. is a nonprofit organization that develops products and services to aid in the M&V of energy and water savings resulting from energy/water efficiency projects—both retrofits and new construction. The site contains the IPMVP, a series of documents for use in developing an M&V strategy, monitoring indoor environmental quality, and quantifying emission reductions.	http://www.ipmvp.org
New York State Energy Research and Development Authority (NYSERDA) Standard Performance Contracting Program Measurement and Verification Guideline. M&V guidelines are included in NYSERDA's request for applications for performance contracting.	http://www.nyserda.org/funding/855PON.html http://www.nyserda.org/wms/docs_funding/909PON.pdf
Northwest Power Planning Council: 5th Power Plan. 2005–2009 Targeted Conservation Measures and Economics.	http://www.nwppc.org/energy/powerplan/draftplan/Default.htm
Oncor Commercial & Industrial Standard Offer Program 2003. Measurement and Verification Guidelines. (Includes retrofit and new construction and default savings values for lighting, motors, and air-conditioning equipment.)	http://www.oncorgroup.com/electricity/teem/candi/default.asp
PA Knowledge Limited 2003: Standardized Methods for Free-Ridership and Spillover Evaluation—Task 5 Final Report. June 16, 2003 (sponsored by National Grid, NSTAR Electric, Northeast Utilities, Unitil and Cape Light Compact). This report is used by Massachusetts utilities to estimate free ridership and spillover effects.	Contact PA Consulting at: http://www.paconsulting.com
Southern California Edison (SCE), December 04 Program Summary Reports.	http://www.sce.com/AboutSCE/Regulatory/eefilings/MonthlyReports.htm

Examples of Legislation/Regulation

State	Title/Description	URL Address
California	**California Interim Opinion: Administrative Structure for Energy Efficiency (Decision 05-01-055).** This CPUC rule sets the administrative structure and process for energy efficiency programs.	http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/43628.htm
	California Interim Opinion: Energy Savings Goals for Program Year 2006 and Beyond (Decision 04-09-060). This CPUC rule sets energy efficiency goals for the state.	http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/40212.htm

State	Title/Description	URL Address
California (cont.)	**California Ruling: Instructions for Filing Proposals on Energy Efficiency Administrative Structure.** This CPUC ruling sets the requirements and process for proposals recommending an energy efficiency administration structure. The ruling includes helpful background documents, including an overview of energy efficiency administration structures in place in other states and a framework for administrative roles and responsibilities.	http://www.cpuc.ca.gov/PUBLISHED/RULINGS/35120.htm
Connecticut	**Energy Independence Act.** This act establishes a Distributed RPS that includes energy efficiency from commercial and industrial facilities, and combined heat and power and commercial and industrial load management programs.	http://www.cga.ct.gov/2005/TOB/h/pdf/2005HB-07501-R00-HB.pdf
Hawaii	**Hawaii's Renewable Portfolio Standard Act.** This act requires electric utilities to meet an RPS of 15% in 2015 and 20% in 2020.	http://www.hawaii.gov/dbedt/ert/rps.html
Illinois	**Illinois Sustainable Energy Plan.** This Web site contains the Illinois Sustainable Energy Plan, as submitted to the Illinois Commerce Commission on February 11, 2004.	http://www.renewableenergyaccess.com/assets/download/IllinoisGov_RPS.pdf
Nevada	**Nevada A.B.3.** This bill redefines the portfolio standard to include energy efficiency and renewable energy.	http://www.leg.state.nv.us/22ndSpecial/Reports/history.cfm?ID=2546 http://leg.state.nv.us/22ndSpecial/bills/AB/AB3_EN.pdf
New Jersey	**Clean Energy Board Order—In The Matter of the New Jersey Clean Energy Program Policies and Procedures (12/09/04).**	http://www.bpu.state.nj.us/wwwroot/cleanEnergy/EO02120955_20041209.pdf
	The State of New Jersey Board of Public Utilities (NJBPU) rule. This rule establishes PBF goals, December 22, 2004. Docket No. EX0404276.	http://www.bpu.state.nj.us/home/BOCleanEn.shtml Click on BPU order EX04040276 (12/23/04).
Pennsylvania	**Pennsylvania Alternative Energy Legislation.** This Web site contains the text of Pennsylvania's Alternative Energy Portfolio Standards Act of 2004 (Senate Bill 1030).	http://www.legis.state.pa.us/WU01/LI/BI/BT/2003/0/SB1030P1973.HTM
Texas	**The Center for Energy Efficiency and Renewable Technologies.** Texas Cleans Up Its Act, article reprinted from the Clean Power Journal. This article details the passage and key provisions of Texas S.B.7, which encourages the development of renewable energy.	http://www.ceert.org/pubs/cpjournal/99/summer/texas.html
	Emission Reduction Incentive Grants Reports. Prepared for the Texas Natural Resource Conservation Commission for a Joint Report to the 78th Legislature. In this report the Texas PUC has quantified the results of legislated energy efficiency programs designed to reduce electric power production and air emissions.	http://www.tnrcc.state.tx.us/oprd/sips/PUC_report.pdf
	PUCOT Rules for Texas Electric Restructuring Act § 25.181. The Texas PUC rules set out implementation strategies for utilities and local governments energy efficiency programs.	http://www.puc.state.tx.us/rules/subrules/electric/25.181/25.181.doc
	Texas S.B.5 and S.B.7. These laws establish energy savings goals for utilities and local government. S.B.7 is the Texas Electric Restructuring Act of 1999, Legislative Session 76.	http://www.puc.state.tx.us/electric/projects/20970/20970arc/sb7rules.doc See also: http://www.capitol.state.tx.us/cgi-bin/db2www/tlo/billhist/billhist.d2w/report?LEG=76&SESS=R&CHAMBER=S&BILLTYPE=B&BILLSUFFIX=00007

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NJBPU. 2004. Clean Energy Board Order—In The Matter of the New Jersey Clean Energy Program (NJCEP) Policies and Procedures. December 1.	http://www.bpu.state.nj.us/wwwroot/cleanEnergy/EO02120955_20041209.pdf
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Public Utility Commission of Texas. 2005. M&V Guidelines. Energy Efficiency Implementation. Austin, TX.	http://www.puc.state.tx.us/electric/projects/30331/052505/m%26v%5Fguide%5F052505.pdf